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NEW CALEDONIA, ISLAND OF BOTANICAL OPPORTUNITY

by Robert F. Thorne[1]

New Caledonia, an Overseas Territory of France, is a small, continental island of approximately 6360 square miles, less than one-seventh the area of the North Island of New Zealand, which lies about a thousand miles to the south of it. Despite its small size, this mountainous, geologically-complex, mineraliferous island surpasses many larger continental areas of the tropics in the richness, uniqueness, and antiquity of its seed-plant flora. It is a treasure-house of floral relicts, preserved here through tens of millions of years of isolation from more "modern," specialized competitors, parasites, and mammalian herbivores. Crowded on the island, mostly on the southern half, are at least 38 species of gymnosperms of five families, including more than half the world's species of Araucariaceae; two endemic genera, *Austrotaxus* and *Neocallitropsis*; and both a palustrine species and a parasitic species among the dozen *Podocarpus*. Five of the ten known genera of primitively vesselless woody angiosperms are found on New Caledonia, three of them endemic. Numerous species of other ancient angiospermous families are prominent in the flora. About 90 per cent of perhaps 2500 species of indigenous flowering plants are endemic and about 80 per cent are woody. Of a possible 660 indigenous genera of flowering plants, about 100, or more than 15 per cent, are restricted to New Caledonia.

Although many botanists, European, Australian, New Zealand, American, and others, have collected assiduously on the island, scores--if not hundreds--of species remain to be collected, described, and named. Extensive mountainous areas distant from roads and towns await botanical exploration. In three weeks of collecting about the island in October and November of 1959, I picked up quite by chance perhaps 15 undescribed species (ten of them now in press) among the 520 indigenous vascular plants that I harvested. My 750 collections were made on short forays from the highways and along well-established trails on relatively well-collected mountains, for I was merely attempting to gain familiarity with the known endemic flora, especially on the extensive areas of serpentine and peridotite. Many of the currently accepted New Caledonian specific names will be reduced to synonymy when thoroughly studied by monographers. At the same time, many new collections and some old specimens incorrectly determined or described as varieties of other species may be recognized as distinct species and named. The final inventory of the indigenous seed-plant flora will probably approximate 2500 species.

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[1] Rancho Santa Ana Botanic Garden, Claremont, California

Disregarding those species awaiting discovery or resurrection, many of those already described and named are barely known, often being represented only by the type or by one or two other collections. The flowers or the fruit of many species are unknown. There is little information about the ecologic and geographic distribution on the island of many plants. Even less is known of the life histories of most of them. The morphology, anatomy, embryology, cytology, genetics, phytochemistry, and paleobotany of very few of the species have been investigated. Yet the island teems with significant non-missing links that require thorough investigation. Amborella of the Annonales and Strasburgeria of the Theales are widely accepted as representing endemic families. Other taxa, like Canacomyrica, Dugezia, Memecylanthus, Oncotheca, Pachydiscus, Paracryphia, Phelline, and Serresia, are anomalous, if not completely misplaced, in the families to which their authors or others have assigned them. Some will certainly be reassigned to other families and one or two others probably will be recognized as representing distinct endemic families. Relatively recently Oceanopapaver was removed from the Papaveraceae to the Capparidaceae; Trisyngyne of the Euphorbiaceae was recognized as Nothofagus of the Fagaceae; and Nautophylla of the Epacridaceae was submerged in Logania of the Loganiaceae. I doubt if any comparable area on earth can contribute as much information to us about evolutionary trends and relationships within the angiosperms as this botanical mother lode. From it we should be able to mine clues to the still mysterious ancestry of the flowering plants.

Analysis of the biota of New Caledonia indicates that the island has not, since its final emersion from the sea, had continuous land connection with any land mass of continental size. The total absence of indigenous terrestrial mammals, snakes, turtles, amphibians, strictly fresh-water fishes, fresh-water mussels, and many seed-plant families cannot be satisfactorily interpreted otherwise. Yet the more nearly harmonic flora of conifers and less specialized woody angiospermous families of Cretaceous origin require more extensive land areas and much narrower water gaps along the Inner Melanesian Arc than now exist. The disharmonic, oceanic herbaceous flora of Tertiary origin and more recently evolved invertebrate fauna suggest, on the other hand, that New Caledonia has been distantly isolated from other islands during most of Tertiary time.

Our present knowledge of the New Caledonian flora reveals strong relationships to the Papuan subregional flora of New Guinea and coastal Queensland. Aside from the genera endemic on New Caledonia, only 81 indigenous New Caledonian seed-plant genera are unreported from New Guinea and 89 from Queensland. Seventeen genera are restricted to New Caledonia and Queensland and other parts of Australia and 17 more to New Caledonia and the archipelagoes from New Guinea to Fiji and Samoa. Other obvious relationships with the floras of New Zealand, Norfolk Island, and Lord Howe Island imply that all of these islands are fragments of the same Inner Melanesian Arc as New Caledonia and southeastern New Guinea. More extensive knowledge about the plants of New Caledonia would help biogeographers understand better the probable biogeographic history of the southwestern Pacific and the biotic relationships of New Caledonia with New Guinea and the rest of Melanesia, Australia, and New Zealand.

Intensive studies of the New Caledonian flora should not be delayed. As on many other tropical islands, the area of native vegetation on la Grand-Terre is rapidly being diminished by frequent and extensive burning, destructive prospecting and mining, timbering, over-grazing, and other disturbances attributable to civilized man. Much of the land so denuded of its natural covering is revegetated by the fire-resistant niaouli, *Melaleuca quinquenervia*, xeromorphic ferns, or by such introduced and pernicious weeds as *Lantana camara* and *Psidium guajava*. Conceivably, some taxa have already been eliminated from the island biota. Others surely will disappear in the coming years. A thorough inventory of the botanical riches of the island must soon be completed. Aside from their scientific value, many of the species have considerable horticultural merit because of their beauty or their peculiarities of habit and foliage. Before this irreplaceable botanical gene reservoir is depleted, seeds and other propagating material should be collected and disseminated to tropical arboreta where the species can be perpetuated and studied scientifically in future years by the botanists of all disciplines.

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BY-LAW AMENDMENT

At the January meeting the membership amended the By-Laws to the Constitution as follows: Article VIII changed to IX and IX to X. The following added as Article VIII:

ARTICLE VIII. GENERAL PROHIBITIONS & DISTRIBUTION ON DISSOLUTION

Section 1. General Prohibitions: Notwithstanding any provision of the Constitution or By-Laws which might be susceptible to a contrary construction:

a. The Hawaiian Botanical Society shall be organized exclusively for scientific and educational purposes;
b. The Hawaiian Botanical Society shall be operated exclusively for scientific and educational purposes;
c. No part of the net earnings of the Hawaiian Botanical Society shall or may under any circumstances inure to the benefit of any private shareholder or individual;
d. No substantial part of the activities of the Hawaiian Botanical Society shall consist of carrying on propaganda, or otherwise attempting to influence legislation;
e. The Hawaiian Botanical Society shall not participate in, or intervene in (including the publishing or distributing of statements) the political campaign on behalf of any candidate for public office;
f. The Hawaiian Botanical Society shall not be organized or operated for profit;

g. The Hawaiian Botanical Society shall not:
  1) lend any part of its income or corpus, without the receipt of adequate security and a reasonable rate of interest to;
  2) pay any compensation, in excess of a reasonable allowance for salaries or other compensation for personal service actually rendered to;
  3) make any part of its services or any other property, for more than adequate consideration in money or money's worth from;
  4) make any purchase of securities or any other property, for more than adequate consideration in money or money's worth from;
  5) sell ary securities or other property for less than adequate consideration in money or money's worth to; or
  6) engage in other transactions which result in substantial diversions of its income or corpus to; any officer, member of the Executive Board, or substantial contributer to the Hawaiian Botanical Society.

The prohibitions contained in this subsection (g) do not imply that the Hawaiian Botanical Society may make such loans, payments, sales or purchase to anyone else, unless such authority be given or implied by other provisions of the Constitution or By-Laws.

Section 2. Distribution on Dissolution. Upon dissolution of the Hawaiian Botanical Society, the Executive Board shall distribute the assets and accrued income to one or more organizations as determined by the Executive Board, but which organization or organizations shall meet the limitations prescribed in subsections (a) - (g) inclusive, of Section 1, Article VIII, immediately preceding.

For the full Constitution and By-Laws of the Hawaiian Botanical Society, see the June, 1964 issue of the Newsletter.

MEETING PROGRAMS

The following programs were presented at the October, November, and December meetings:

October 5: Roses in the subtropics, by Dr. Samuel E. McFadden, Jr., Visiting Professor, Department of Horticulture, University of Hawaii (from the University of Florida).

November 2: The history of polyploid complexes, by Dr. G. Ledyard Stebbins, visiting National Lecturer for the Society of the Sigma Xi (from the University of California, Davis).

December 7: The alpine flora of New Guinea, by Dr. Sherwin Carlquist, Claremont Graduate School and Rancho Santa Ana Botanic Garden, Claremont, California.

NOTES AND NEWS

VISITORS: Dr. Ira J. Condit, emeritus professor of Horticulture at the University of California, Riverside, is currently in Hawaii to continue his extensive research on the cultivated species of Ficus. Dr. Condit will be working on the extensive collections in the Harold L. Lyon Arboretum and is headquartered at the Department of Horticulture during his stay in the islands. During his visit he will study other Ficus collections on Hawaii in addition to those on Oahu.

Dr. Sherwin Carlquist of the Rancho Santa Ana Botanic Garden and Claremont Graduate School conducted extensive field studies in Hawaii during December. Dr. Carlquist is continuing his extensive research on the anatomy of the Lobeliaceae and of the genus Scaevola. His recently completed book on the evolution of island biota is now in press and will be out this coming fall. This contribution is derived from extensive research and field studies in Hawaii and other major island groups in the Pacific.

THE U.H. PLANT SCIENCE PROGRAM--A LOOK AHEAD: The Executive Committee of the Hawaiian Botanical Society believes that the membership should be fully appraised of the University of Hawaii's program leading to development of a Plant Science Institute. The Plant Science program will coordinate activities of the present departments of Botany, Horticulture, Plant Pathology and Plant Physiology, including to some extent activities in other departments. A new building will be constructed to house these departments, and to facilitate the growing research programs in plant sciences at the University.

A feeling held throughout the UH plant science faculty is that the University must strive for a position of leadership in tropical plant sciences. Because of its location and its relationship to important plant science research organizations supported by tropical industries, potential contribution is very great.

Over 50 full time faculty members at the University are associated with plant science instruction and research. Over 60 candidates for master's and doctoral degrees are presently enrolled in these programs. Undergraduate training involves a large number of University students, and special training programs affect many high school science students and teachers. Federal research grants complement state funds to bring almost $200,000 per year to plant scientists at the University. These funds attract advanced research scholars throughout the world. At the present time, there is not enough "grow-room" for either plants or students and new faculty at the University of Hawaii. Plans were therefore instituted several years ago for a plant science building program. The University Board of Regents has requested that planning moneys for this building be given third priority in the University's capital improvements plant for the 1966 fiscal year. This building will represent an important step forward for botanical sciences in Hawaii, and deserves your interest and support.

MARCH MEETING

Monday, March 1, 1965. 7:30 p.m. Agee Hall, H.S.P.A. Experiment Station, 1527 Keeaumoku Street. The speaker will be Dr. Ira J. Condit, Professor Emeritus of Horticultural Science at the University of California, Riverside. Topic: The Confused and Confusing Figs (illustrated). Dr. Condit has spent about 40 years of research on figs, and has become the authority on the edible fig. He has published, among other things, a book entitled "Fig" (Chronica Botanica 1947), a monograph on fig varieties, a bibliography on figs, and has currently a 500-page book on the ornamental figs in press.

REMINDER

The semi-annual plant donation raffle for the refreshment fund will take place at the April meeting.

Cash in Bank:			
Commercial Account		$ 35.64	
First Federal Savings & Loan Assn.		1,126.12	
			$1,161.76
Receipts:			
Dues		438.00	
Interest on Savings & Loan Account		52.86	
Contributions		10.50	
			501.36
			1,663.12
Expenditures:			
Secretary's expenses, mailing notices, news letters, etc.		238.81	
Treasurer's expenses, mailing, bills, etc.		29.44	
Dues, Contributions and Prizes:			
Nature Conservancy 1964 dues	$10.00		
Hawaiian Botanical Gardens Foundation 1964 dues	25.00		
ISSEC - Contribution to Science Fair	25.00		
Hawaii Science Fair 1963	25.00		
Hawaii Science Fair 1964	25.00		
Botanical Society of America Membership for Marilyn Galang and Richard Kuramoto	12.00		
Friends of Foster Gardens 1964 dues	25.00		
Conservation Council of Hawaii 1964 dues	5.00	152.00	
Miscellaneous		10.14	
			430.39
			$1,232.73
Cash in Bank 11/30/64:			
Commercial Account		$ 106.61	
First Federal Savings & Loan Assn.		1,126.12	
			$1,232.73
1/1/64 Transfer from Savings Account			$58.62
1964 dues outstanding			16

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THE HAWAIIAN BOTANICAL SOCIETY was founded in 1924 to "advance the science of Botany in all its applications, encourage research in Botany in all its phases," and "promote the welfare of its members and to develop the spirit of good fellowship and cooperation among them." "Any person interested in the plant life of the Hawaiian Islands is eligible for membership in this Society."

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The Hawaiian Botanical Society Newsletter is published in February, April, June, October, and December. It is distributed to all Society members and other interested institutions and individuals with the purpose of informing them about botanical news and progress in Hawaii and the Pacific. News contributions and articles are welcomed. The deadline submission of news items is the 20th of each month prior to publication. Produced at the University of Hawaii and at the Experiment Station, HSPA. Membership dues are $3.00 per calendar year and include receipt of the Newsletter.

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